



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/GB98/03605 <b>(22) International Filing Date:</b> 4 December 1998 (04.12.98) <b>(30) Priority Data:</b> 9725799.2                      6 December 1997 (06.12.97)                      GB <b>(71) Applicant (for all designated States except US):</b> AGREVO UK LIMITED [GB/GB]; Hauxton, Cambridge CB2 5HU (GB). <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> MISTRY, Surendra, Durlabh [GB/GB]; Chesterford Park, Saffron Walden, Essex CB10 1XL (GB). AMEY, Christopher, Michael [GB/GB]; Chesterford Park, Saffron Walden, Essex CB10 1XL (GB). <b>(74) Agent:</b> WALDMAN, Ralph, David; AgrEvo UK Limited, Patent Dept., Chesterford Park, Saffron Walden, Essex CB10 1XL (GB).		<b>(81) Designated States:</b> AU, BR, CA, CN, CZ, HU, ID, IL, JP, KR, MX, NZ, PL, RU, TR, UA, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
<b>(54) Title:</b> PESTICIDAL COMPOSITIONS  <b>(57) Abstract</b>  The properties of pesticide compositions for application to seed are enhanced by inclusion of at least 5 % by weight of an ethylene oxide-propylene oxide block copolymer surfactant.		

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Title: Pesticidal compositions

Field of the invention

This invention relates to novel pesticide formulations.

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One method of applying pesticides to a crop is by means of a seed treatment. As the plant grows it can be protected from the pests which the particular pesticide is used to combat.

10 Commercially, seeds are treated with the pesticide in seed treatment application equipment in which the pesticide in a formulation is mixed with the seeds. When a formulation is used in which the pesticide is in a particulate form, there is a danger of operator exposure to pesticide dust particles and/or large quantities of pesticide can be lost from the seed as a result of poor adhesion to the seed. Similarly there is risk of  
15 operator exposure when the seed treatment equipment is cleaned to remove dried deposit and when the treated seed is drilled in the field.

It is well known that ethylene oxide-propylene oxide block copolymers are used, typically at 1-3%, as dispersants in pesticidal formulations. We have now found that  
20 these problems mentioned above can be mitigated by using high levels of ethylene oxide-propylene oxide block copolymer in the pesticide formulation.

Thus, according to the invention, there is provided a pesticide composition for application to a seed, which composition includes at least 5% by weight of an ethylene  
25 oxide-propylene oxide block copolymer surfactant.

Although such copolymers have been used in agrochemical formulations, we are not aware that they have been used at such high levels. We have demonstrated that high levels are necessary to obtain the benefits of the invention.

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The compositions generally contain from 5% to 30%, preferably 5 to 15%, by weight of an ethylene oxide-propylene oxide block copolymer surfactant.

The invention can be used in conjunction with any pesticide which would be applied as  
35 a seed treatment, but is particularly useful for fungicides, insecticides, safeners and agrochemical adjuvants, and especially fungicides.

Fungicides that can be included in the compositions of the invention are for example triazoles, such as fluquinconazole, flutriafof and triticonazole, and other fungicides, such as carbendazim, prochloraz-copper-chloride complex, tolclofos-methyl, pyrimethanil, carboxin, captan and chlorothalonil. Insecticides that can be incorporated  
5 into the composition of the invention include pyrethroids, such as deltamethrin, carbamates such as bendiocarb, and chlorinated hydrocarbons, such as endosulfan. Other compounds include, bronopol, anthraquinone, safeners and various adjuvants.

In the compositions of the invention, the active ingredient is usually in particulate form  
10 and includes flowable seed treatments (FS), wettable powders in suspension (WS), dry seed treatments (DS) and micro encapsulated suspension seed treatments (CS). The compositions may also be liquid seed treatments (LS) or emulsions in water (EW).

The compositions usually contain a colouring agent. This is preferably a pigment  
15 dispersion which may help improve the stability of the formulation.

The invention is illustrated in the following Examples

#### Example 1

20 Seed treatment compositions were formulated by combining the following ingredients

<u>Composition 1</u>	
<u>Component</u>	<u>g/l</u>
Fluquinconazole technical	167.0
25 Synperonic PE/F127 (Block copolymer of ethylene and propylene oxide)	100.0
Acrylic graft copolymer surfactant	6.7
Red pigment dispersion containing propane-1,2-diol	47.8
Silicone antifoam	8.0
30 Monopropylene glycol antifreeze	120.0
Biocide (1,2-benzisothiazolin-3-one sodium salt in propylene glycol and water)	2.0
Xanthan gum	2.5
Water to 1 litre	

Composition 2

<u>Component</u>	<u>g/l</u>
Fluquinconazole technical	167.0
Prochloraz copper(II) chloride complex technical	34.0
5 Synperonic PE/F127 (Block copolymer of ethylene and propylene oxide)	100.0
Acrylic graft copolymer surfactant	8.0
Fatty alcohol ethoxylate surfactant	2.0
Red pigment dispersion containing propane-1,2-diol	47.8
10 Silicone Antifoam	8.0
Monopropylene glycol antifreeze	120.0
Biocide (1,2-benzisothiazolin-3-one sodium salt in propylene glycol and water)	2.0
Xanthan gum	2.5
15 Water to 1 litre	

Both these compositions produced little or no dust when used to treat seeds and thus provided little or no danger of operator exposure.

20 Example 2

The compositions were tested for their effectiveness for coating seeds

1 kg of wheat seed were treated with the compositions of the invention using a "Rotostat" seed treatment apparatus. The seeds were allowed to dry for 24 hours.

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50 g of seed were placed in a 250 ml conical flask. 50 ml isopropanol was added, the flask agitated for 15 seconds and the isopropanol decanted< this extraction procedure was repeated four times and the combined extracts made up to 200 ml with isopropanol. The solution was measured colorimetrically, to give a baseline

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absorbance.

100 g of treated wheat seed was introduced to a fluidised air bed and mixed for 5 minutes. 50g of these seeds were measured colorimetrically as above to obtain the second absorbance figure. From these two figures the % of adhesion can be

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calculated according to the following equation:

$$\frac{\text{absorbance after mixing} \times 100}{\text{absorbance before mixing}} = \% \text{ adhesion}$$

From this, the % lost (Dust Off) can be calculated:

For the purposes of comparison the tests were repeated with composition in which the ethylene oxide-propylene oxide block copolymer was used at a low rate or replaced by  
5 other surfactants/polymers which are conventionally used to reduce dust levels and improve adhesion to the seed.

The results are shown below

Composition	% lost
Composition 1	5.9
Composition 1 but 1% Synperonic PE/F127	29.7
Composition 1 with Synperonic PE/F127 replaced by 10% Agrimer VA 7W, a vinyl acetate/vinyl pyrrolidone copolymer	11
Composition 1 with Synperonic PE/F127 replaced by 10% Agrimer VA 6, a vinyl acetate/vinyl pyrrolidone copolymer	30.9
Composition 1 with Synperonic PE/F127 replaced by 20% Agrimer VA 6, a vinyl acetate/vinyl pyrrolidone copolymer	19.5
Composition 1 with Synperonic PE/F127 replaced by 20% DP 1230, a polyamide	17

Example 3

Example 2 was repeated except the seed treatment was carried on a commercial scale using a "Roeber" seed treater.

5 The results are shown below

Composition	% lost
Composition 1	14.3
Composition 2	5.4
Composition 1 but 1% Synperonic PE/F127	27.8
Composition 2 but 1% Synperonic PE/F127	14.8
Composition 1 with Synperonic PE/F127 replaced by 10% Agrimer VA 7W, a vinyl acetate/vinyl pyrrolidone copolymer	22.8
Composition 2 with Synperonic PE/F127 replaced by 10% Agrimer VA 7W, a vinyl acetate/vinyl pyrrolidone copolymer	20.3
Composition 1 with Synperonic PE/F127 replaced by 50% Courgel AG1111, a polyamide	41.6

It will be seen from Examples 2 and 3, low levels of the ethylene oxide-propylene oxide block copolymer surfactant or use of other polymers results in much higher loss of active ingredient from the seeds compared with the compositions of the invention.

Example 4

This example demonstrates the improved flow properties of seed treated with the compositions of the invention according to Example 2.

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A polyethylene funnel of standard dimensions (c.1 litre capacity with 45 degree sides and a bottom neck aperture of 18mm) is supported in a retort stand. The bottom is closed and 500 g of seed is added to the funnel, the seed is then allowed to flow through the bottom aperture and the time taken for all the seed to flow out is measured (to 1/100th of a second). The test is repeated twice and the average of the three tests calculated.

20

The results are as follows. For the purposes of comparison, the flow rate of seed treated with composition containing low levels of polymer was also measured as was seed coated with the commercial seed treatment fungicide product "Baytan".

Composition	Flow time (secs)
Composition 1	5.45
Composition 2	5.49
Composition 1 but 1% Synperonic PE/F127	6.13
Composition 2 but 1% Synperonic PE/F127	6.15
Baytan	6.53
Untreated	5.24

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It will be seen that seed treated with the compositions of the invention containing high levels of the ethylene oxide-propylene oxide block copolymer surfactant flows almost as fast as untreated seed (which would be expected to flow fastest since the coating impedes the flow). Further the seed treated according to the invention flows

10 considerably faster than the seed treated with the compositions containing low levels of the ethylene oxide-propylene oxide block copolymer and also much faster than the Baytan treated seeds.



## CLAIMS

1. A pesticide composition for application to a seed, which composition includes at least 5% by weight of an ethylene oxide-propylene oxide block copolymer surfactant.
- 5 2. A composition according to claim 1, in which the pesticide is fluquinconazole.

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 98/03605

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 A01N25/30 A01N43/653

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 067 479 A (STAUFFER CHEMICAL CO) 22 December 1982 see page 3, line 7-8, and page 4, line 14-21 ---	1
X	EP 0 091 213 A (FMC CORP) 12 October 1983 see page 5, line 10-14 ---	1
X	EP 0 257 533 A (HOECHST AG) 2 March 1988 see Table 1, examples 3, 17-21, 23-26, 28, 30 ---	1
X	EP 0 697 171 A (ROHM & HAAS) 21 February 1996 see Table 2, formulations 5 and 10 ---	1
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>DATABASE WPI  Section Ch, Week 9716  Derwent Publications Ltd., London, GB;  Class A97, AN 97-177460  XP002100290  &amp; RU 2 064 764 C (PLANTS CHEM PROTECTION  RES INST), 10 August 1996  see abstract</p> <p>---</p>	1
X	<p>DE 15 42 875 A (HOECHST AG) 4 June 1970  see page 2, paragraph 4; examples 1-7</p> <p>---</p>	1
X	<p>C. G. UTZ, G. W. DREWNO &amp; R. P. HOLLIS:  "Using nonionic surfactants in aqueous  formulations"  ASTM SPEC. TECH. PUBL.,  no. 1146, 1993, pages 133-144, XP002100289  see tables 1 and 4 - 6</p> <p>---</p>	1
A	<p>EP 0 183 458 A (FBC LTD) 4 June 1986  see example 6B</p> <p>-----</p>	2

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Information on patent family members

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PCT/GB 98/03605

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